REMARKS

Initially, the Examiner's grant of an interview on November 19, 2003 has been appreciated. As discussed at the close of that interview, this Response presents the Applicant's arguments in formal, written form. and also refers back to previous arguments concerning the content of Applicant's specification and what that content would teach to those of ordinary skill in the art.

Paper No. 25 rejects all of pending claims 6-13 under 35 U.S.C. §103(a). Specifically, the claims are rejected as purportedly obvious over the Applicant's admitted prior art (AAPA) in view of the previously-cited Arevalo patent, and further in view of U.S. Patent 5,737,665 to Sugiyama, et al. The rejection is respectfully traversed.

The rejection is untenable because it improperly relies upon hindsight in combining the AAPA with Arevalo (and Sugiyama, et al.). The AAPA teaches, to those of ordinary skill in the art, a conventional potential correction technique for adjusting laser exposure intensity in an image forming apparatus. The AAPA is specific in describing the technique as involving a first step of dark potential correction, followed by one or more steps of residual potential correction. According to the AAPA, in the first residual potential correction step, an arbitrary laser intensity is set and then the photoreceptor is exposed. Thereafter, the potential is measured. This results in a point representative of the measured potential versus laser intensity which can be plotted as shown in the attached Exhibit 1, which comes from Figure 6 in the present application. For simplicity, this point is labeled in Exhibit 1 as point (1, 2). The AAPA does not describe any additional sources or alternative procedures to this basic technique. Applicant criticizes the AAPA as requiring a large number of iterations and therefore long processing time in order to accomplish the correction.

Arevalo, on the other hand, is directed to a method and an apparatus for <u>phase shifting</u>. There is no suggestion <u>in Arevalo</u> that any teaching therein would have any benefit, or indeed any application, in a method for adjusting laser exposure intensity in an image forming apparatus. As stated above, nor is there any description in the AAPA to

look beyond the process described thereby. Thus, neither the AAPA nor Arevalo contains any suggestion or motivation for those of ordinary skill in the art to have looked to any part of the Arevalo disclosure in optimizing a potential correction process for an electrophotographic digital image forming apparatus. There simply is no suggestion that any teaching from a patent directed to phase shifting would be applicable to potential correction in such an apparatus. Therefore, Applicant courteously urges that the asserted combination of the AAPA and Arevalo improperly is based upon hindsight learned from Applicant's own specification.

This conclusion is compelled from a more detailed look at the teachings of each of the AAPA and Arevalo. First, consider the problem that Applicant solves with his claimed invention, that is, determination of a potential value along what Applicant recognizes to be a non-linear relationship between laser intensity and residual potential value. Applicant's objective is to locate this value within significantly shorter processing times than required for the AAPA conventional method. The AAPA taught those of ordinary skill in the art to use a linear equation previously obtained through experimentation. (See Applicant's specification, paragraph bridging pages 4 and 5.). A segment along such linear equation is shown by the line in Figure 6 and Exhibit 1. Thus, again with regard to Exhibit 1, those of ordinary skill would have plotted the point (1, 2). This point would give the parameter "b" in the equation for a straight line:

$$y = mx + b.$$

Through prior experimentation, the slope "m" already would have been known, whereafter the equation for "y" is evident once "b" was located by exposure and measurement during the first residual potential correction step which determined point (1, 2).

Notwithstanding the vast difference in subject matter between the AAPA and Arevalo , Applicant looks to Arevalo's initialization algorithm as described at column 5, beginning at line 44, and illustrated in Arevalo's Figure 4. To the teaching of the AAPA, Arevalo would add assignment of arbitrary lower and upper laser intensity values in order to define a range such as also shown in Exhibit 1. Thereafter, Arevalo's algorithm

proceeds with the division of the range in half, and the selection of one point nearest the middle of each half-range for use as new intensity input values. The intensity value corresponding to the better-performing point is determined and this half of the range becomes a new range whereupon a new midpoint is set therein, and two new test points are chosen near the middle of each new half- range.

In combination with the teaching of the AAPA, therefore, the Arevalo algorithm operates to define progressively narrow ranges along the line in Exhibit 1. There is no suggestion, however, in either the AAPA or Arevalo, that modification of the AAPA to include Arevalo's algorithm would, in any way, reduce processing time. Moreover, due to problems in drift of the potential value[1], the AAPA, if modified according to Arevalo may never locate the desired potential when the potential lies on the non-linear curve shown in both Figures 3 and 6 of the application, and Exhibit 1. Thus, there is no teaching or suggestion from either the AAPA or Arevalo (and none added by the newly-cited Sugiyama, et al. patent) to carry out Arevalo's algorithm to enhance processing speed in the AAPA technique, or to locate potential values on any curve other than the experimentally-determined linear equation taught by the AAPA. For these reasons, the rejection is respectfully urged as improperly based upon hindsight, and withdrawal thereof earnestly is solicited.

During the interview, the Examiner also expressed interest in Applicant's prior arguments and prior position with respect to his second potential detecting step, and particularly the step of obtaining fine laser intensity values within the second detecting step. In response to that interest, Applicant now submits new claim 14. Claim 14 is a dependent claim that recites that only steps (ii) and (iii) are repeated when the second potential detecting step itself is repeated. This was a prior significant issue in connection with the prosecution of this application. The issue was whether Applicant's specification provides adequate support for a claim such as new claim 14. This issue was debated in

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[1] See Applicant's Response To Paper No. 14 of January 9, 2002 (pages 3-5) which discusses the phenomenon of potential drift and its implications for potential correction in detail.

defense of amendments made to claim 1 by Applicant's Response of July 21, 2001. All along, Applicant has submitted that his specification indeed supports a claim such as new claim 14. To demonstrate that support, Applicant focuses on pages 10-12 of his specification.

As the Examiner notes from the paragraph bridging pages 10 and 11 of the specification, Applicant's first potential detecting step is carried out with the coarse laser intensities P_{MAX} x (920/1023), P_{MAX} x (940/1023), P_{MAX} x (960/1023), P_{MAX} x (980/1023), and P_{MAX} x (1000/1023) according to an interval of P_{MAX} x (10/1023). Only one set of interval step intensity values are given for the coarse potential detecting step in the paragraph bridging pages 10-11. Likewise, only one set of fine interval step intensity values is given for the fine potential detecting step example described in the paragraph bridging pages 11-12. There is no further modification of the fine intensity value interval once the interval has been set. Nothing in Applicant's original disclosure leads those of ordinary skill in the art to change the small interval intensity value steps taught by this paragraph bridging pages 11-12, during repetitive performance of steps S4 - S7. Rather, as described in the last two sentences of the referenced paragraph, "Then, using these laser intensities thus selected, the operations of steps S4 - S6 are repeated. Thereafter, the step S7 and the steps S4 - S6 are repeated until the finished condition is satisfied at the step S6." In those sentences, the words "these laser intensities thus selected" are those given in the example immediately above, that is, the small interval intensities P_{max} x (950/1023), P_{max} x (952/1023), P_{max} x (954/1023), P_{max} x (956/1023) and P_{max} x (958/1023). Once the fine intensity values of page 12 are calculated, consistent with Applicant's position, the specification gives no further examples of different fine intensity values because no further different values are used until the final maximum intensity has been obtained.

Notwithstanding that the AAPA, Arevalo, and Sugiyama, et al. as asserted in Paper No. 25 are not properly combinable against the claims, Applicant's particular method of carrying out the fine potential detecting step as set forth in claim 14 still would patentably

distinguish his invention even if this asserted combination were proper. Applicant's second, or fine, potential detecting step as generally defined in claim 6 includes separate sub-steps of (i) obtaining a second plurality of laser intensity values, (ii) successively exposing a surface portion of said photoreceptor surface with laser light having intensities corresponding to said second plurality of intensity values, and (iii) detecting the potential of each of said exposed patch portions. Thereafter, claim 14 calls for repeating only sub-steps (ii) and (iii) of the second potential detecting step (of claim 6). Applicant emphasizes that, completely unlike Arevalo, there is no calculation of a third plurality, fourth plurality, etc. of intensity values used to expose the photoreceptor surfaces during the Applicant's recited "repeating step." This is because Arevalo teaches reduction of the intensity value range by one-half each time his potential detecting algorithm is repeated. Claim 14, by contrast, constrains repetition of the sub-steps of the second, or fine potential detecting step to sub-steps (ii) and (iii) which use only the second plurality of intensity values calculated at sub-step (i) of the fine potential detecting step of claim 6. As such, claim 14 patentably distinguishes over all of the asserted art.

In view of the foregoing comments, Applicant courteously urges that all of claims 6-14 are allowable over the AAPA, the Arevalo patent, and the Sugiyama, et al. patent. Further action in this application, consistent with the foregoing, courteously is solicited.

Respectfully submitted,

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LISTING OF CLAIMS

Claims 1-5 (cancelled)

6. (previously added) A laser intensity adjusting method of adjusting a maximum intensity of a laser exposure mechanism for irradiating laser light to a surface of a photoreceptor to which a uniform potential is being given by a corona discharger, said method comprising:

a first potential detecting step including the steps of (i) obtaining a first plurality of laser intensity values that increase from an initial value to a predetermined value according to a first interval to provide a first range of intensity values, (ii) successively exposing a surface portion of the photoreceptor surface with laser light having intensities corresponding to said first plurality of intensity values to provide a plurality of exposed patch portions on the photoreceptor surface, and (iii) detecting the potential of each of said plurality of exposed patch portions;

a second potential detecting step including the steps of (i) obtaining a second plurality of laser intensity values that increase from an initial value to a predetermined value according to a second interval to provide a second range of intensity values, said second interval being smaller than said first interval and said second range being smaller than said first range, (ii) successively exposing a surface portion of said photoreceptor surface with laser light having intensities corresponding to said second plurality of intensity values to provide a plurality of patch portions on the photoreceptor

surface; and (iii) detecting the potential of each of said plurality of exposed patch portions; and

a step of setting, as a maximum intensity of the laser exposure mechanism, a laser intensity with which there has been detected, at said first or said second potential detecting step, a potential equal to or substantially equal to a predetermined set potential,

wherein said laser intensities corresponding to said second plurality of intensity values are selected to be close to a laser intensity value corresponding to a potential detected during said first potential detecting step as closest to said predetermined set potential.

7. (previously added) A laser intensity adjusting method according to claim 6, wherein

said second potential detecting step is repeated until there is obtained a potential equal to or substantially equal to said predetermined set potential.

8. (previously added) A laser intensity adjusting method according to claim 6, wherein

said laser intensity values obtained at first potential detecting step have values selected from a plurality of laser intensities obtained by dividing said predetermined laser intensity value of said first potential detecting step by a first predetermined number.

9. (previously added) A laser intensity adjusting method according to claim 6, wherein

said laser intensity values obtained at said second potential detecting step have values selected from a plurality of laser intensities obtained by dividing said predetermined laser intensity value of said second potential detecting step by a second predetermined number.

10. (previously added) A laser intensity adjusting method according to claim 8, wherein

said predetermined laser intensity value is set to a value which is greater than a suitable maximum intensity.

11. (previously added) A laser intensity adjusting method according to claim 9, wherein

said predetermined laser intensity value is set to a value which is greater than a suitable maximum intensity.

12. (previously added) A laser intensity adjusting method according to claim 6, wherein said exposed patch portions are spaced apart from each other on the photoreceptor surface.

13. (previously added) A laser intensity adjusting method according to claim 12, wherein said exposed patch portions are generally rectangular areas on the photoreceptor.

14. (new) A laser intensity adjusting method according to claim 6, further comprising repeating steps (ii) and (iii) of said second potential detecting step until said maximum intensity has been set.

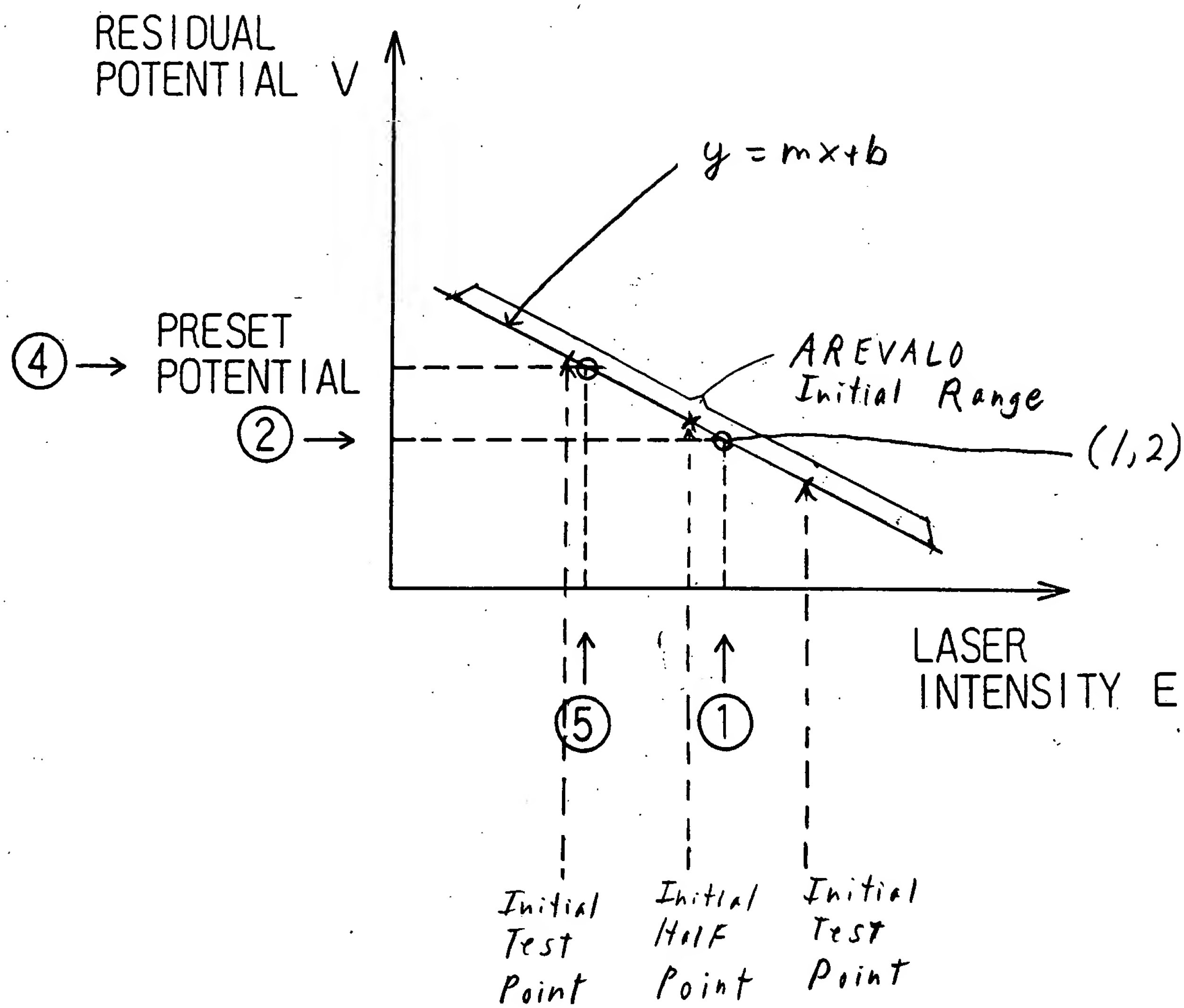
RESIDUAL
POTENTIAL V
y = mx+b
4
PRESET
POTENTIAL
2
AREVALO
Initial Range
(1,2)
5
1
LASER
INTENSITY E
Initial
Test
Point
Initial
Half
Point
Initial
Test
Point

Exhibit 1